CLAIMS

1. A method for forming an ordered structure of amphiphilic molecules, comprising:

contacting a population of amphiphilic molecules with a interface;

laterally compressing said population to an appropriate pressure, such that an ordered structure of said amphiphilic molecules is formed at said interface.

2. The method of claim 1, wherein said appropriate pressure is appropriate to form a two-dimensional ordered structure.

3. The method of claim 1, wherein said amphiphilic molecule comprises a protein.

4. The method of claim 1, wherein said protein is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

5. The method of claim 1, wherein said amphiphilic molecule is contacted with said interface in the presence of lipids.

6. The method of claim 1, further comprising applying said proteins to said interface in proteoliposomes, liposomes, or a cellular membrane.

7. The method of claim 1, wherein said appropriate pressure is appropriate to form a three-dimensional ordered structure.

8. The method of claim 1, wherein said interface is a gas-aqueous interface.

9. A two-dimensional ordered structure, comprised of a population of amphiphilic molecules.

10. The two-dimensional ordered structure of claim 9, wherein said population of amphiphilic molecules comprises proteins, glycoproteins, glycolipids, or steroids.

11. The two-dimensional ordered structure of claim 9, wherein said population of amphiphilic molecules consists of proteins.

12. The two-dimensional ordered structure of claim 11, wherein each of said proteins is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

13. The two-dimensional ordered structure of claim 9, wherein said ordered structure is formed by planar membrane compression.

14. The two-dimensional ordered structure of claim 9, wherein said two-dimensional ordered structure is mounted on a solid support.

15. The two-dimensional ordered structure of claim 14, wherein said solid support is glass, plastic, wood, metal, or suitable for screening assays.

16. The two-dimensional ordered structure of claim 15, wherein said screening assay is a low throughput screening assay, medium through put screening assay, a high throughput screening assay, or an ultra high through put screening assay.

17. The two-dimensional ordered structure of claim 9, wherein the structure of said amphiphilic molecules can be determined.

18. The two-dimensional ordered structure of claim 17, wherein said structure of said amphiphilic molecules can be determined using electromagnetic radiation or neutron diffraction techniques.

19. A three-dimensional ordered structure, wherein said ordered structure is formed by a method comprising:

contacting a population of amphiphilic molecules with a interface;

compressing said population to an appropriate pressure, such that a three-dimensional ordered structure is formed at said interface.

20. The three-dimensional ordered structure of claim 19, wherein said population of amphiphilic molecules comprises proteins, glycoproteins, glycolipids, or steroids.

21. The three-dimensional ordered structure of claim 19, wherein said population of amphiphilic molecules consists of proteins.

22. The three-dimensional ordered structure of claim 21, wherein each of said proteins is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

23. The three-dimensional ordered structure of claim 19, wherein said three-dimensional ordered structure is mounted on a solid support.

24. The three-dimensional ordered structure of claim 23, wherein said solid support is glass, plastic, wood, metal, or suitable for screening assays.

25. The three-dimensional ordered structure of claim 24 wherein said screening assay is a low throughput screening assay, medium through put screening assay, a high throughput screening assay, or an ultra high through put screening assay.

26. The three-dimensional ordered structure of claim 19, wherein the structure of said amphiphilic molecules can be determined.

27. The three-dimensional ordered structure of claim 26, wherein said structure of said amphiphilic molecules can be determined using electromagnetic radiation diffraction techniques.

28. The three-dimensional ordered structure of claim 19, wherein said amphiphilic molecule is insoluble in water.

29. A method for determining the shape of an amphiphilic molecule, comprising

contacting a population of said molecule with a interface;

compressing said population to an appropriate pressure, such that an ordered structure is formed at said interface, and

analyzing said ordered structure such that the shape of said amphiphilic molecule is determined.

30. The method of claim 29, wherein said population of amphiphilic molecules comprises proteins, glycoproteins, glycolipids, or steroids.

31. The method of claim 29, wherein said population of amphiphilic molecules consists of proteins.

32. The method of claim 31, wherein each of said proteins is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

33. The method of claim 29, wherein said ordered structure is two-dimensional.

34. The method of claim 29, wherein said shape is determined by electromagnetic radiation.

35. The method of claim 34, wherein said electromagnetic radiation is selected from the group consisting of light, electrons, x-rays, neutrons, or gamma rays.

36. The method of claim 34, wherein said shape is determined by digital laser fluorescence video microscopy, x-ray crystallography, or electron crystallography.

37. The method of claim 29, wherein said protein array is cryopreserved prior to determination of said shape.

38. The method of claim 29, wherein said analysis comprises subjecting said protein array to test conditions and determining a shape change of said protein.

39. The method of claim 38, wherein said test conditions comprise contact at least a portion of said protein array with a test compound.

40. The method of claim 29, wherein said sufficient amount is sufficient to form a three-dimensional ordered structure.

41. A method for screening a test compound, comprising:

contacting said test compound with an ordered structure; and

analyzing the results of the interaction of said test compound and the ordered structure, such that said test compound is screened.

42. The method of claim 41, wherein said ordered structure is mounted on a solid support.

43. The method of claim 41, wherein said ordered structure comprises a protein.

44. The method of claim 41, wherein said protein is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

45. The method of claim 41, wherein said test compounds are screened for binding, agonist, antagonist, inhibitor, or activator activity.

46. The method of claim 41, wherein said analysis comprises analyzing a shape change of said protein.

47. The method of claim 46, wherein said shape changes corresponds to the multimerization of said protein.

48. The method of claim 47, wherein said multimerization is a dimerization.

49. A protein chip, comprising a solid support and at least one ordered structure of an amphiphilic molecules.

50. The protein chip of claim 49, wherein at least one of said amphiphilic molecules is a protein.

51. The protein chip of claim 49, wherein said amphiphilic molecule is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

52. The protein chip of claim 49, wherein said protein chip comprises two or more ordered structures.

53. The protein chip of claim 49, wherein said protein chip is suitable for automated screening techniques.

54. The protein chip of claim 49, wherein said ordered structure is fabricated by planar membrane compression.

55. A method for fabricating an ordered structure of a protein, comprising:
expressing said protein in a cell;
obtaining said protein from said cell;
applying said protein to an interface;
compressing said protein on said interface to an appropriate pressure, such that an ordered structure of said protein is formed.

56. The method of claim 55, wherein said protein is over expressed in said cell.

57. The method of claim 55, wherein said protein is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

58. The method of claim 55, wherein said protein is applied to said interface in the presence of membrane lipids.

59. A method for determining the structure of a protein, comprising:
expressing said protein in a cell;
obtaining said protein from said cell;
applying said protein to an interface;

compressing said protein on said interface to an appropriate pressure, such that an ordered structure of said protein is formed; and

analyzing said ordered structure such that the structure of said protein is determined.

60. The method of claim 59, wherein said protein is a membrane protein, a cellular receptor, an orphan receptor, receptor tyrosine kinase, an EPH receptor, an ion channel, a cytokine receptor, an multisubunit immune recognition receptor, a chemokine receptor, a growth factor receptor, or a G-protein coupled receptor.

61. The method of claim 59, wherein the structure of said protein is determined using electromagnetic radiation diffraction.

62. A protein chip, comprising a plurality of ordered structures in discrete wells, wherein said ordered structures are fabricated by planar membrane compression.